REMARKS

In response to the Office Action mailed February 9, 2005, and in view of the Request for Continued Examination submitted herewith, Applicants respectfully request reconsideration. Claims 12-23 and 86-124 have been examined.

Rejections Under 35 U.S.C. §103

Claims 12-23 and 86-124 are rejected under 35 U.S.C. §103(a) as being unpatentable over Liang (U.S. Patent No. 5,719,948) in view of Shaw (U.S. Patent No. 3,663,813), Falls (U.S. Patent No. 4,567,370) and Stenzel et al. (U.S. Patent No. 4,146,792). Reconsideration is respectfully requested.

By this Amendment, each of the independent claims has been amended to recite that the authentication device includes a light source that emits light in the infrared (IR) range and a detector that detects emission of light in the IR range from the light-sensitive compound. That is, the device of the present invention:

1) illuminates the mark with IR light from an IR light source, and

2) detects IR light emitted from the mark.

It is respectfully submitted that the prior art, whether singularly or in combination, does not teach or suggest this combination.

A. Prior Art

Liang

As previously discussed, Liang teaches an authentication device utilizing fluorescent imaging and optical character recognition. As noted by the Examiner, Liang teaches an authentication device that includes a source of ultraviolet light and a device for capturing and recognizing graphic images made with fluorescent substances that are rendered detectable (i.e., that fluoresce) after UV light illumination (see Abstract). Thus, Liang teaches:

A1) illumination with a UV light source producing UV light, and

A2) detection of fluorescence as a result of the UV illumination. (see also col. 5, lines 11-15).

Liang also teaches that the authentication device can have an optional visible/IR light source 20.

While Liang teaches the use of an optional visible/IR light source 20, the Applicants herewith submit the attached Declaration of Mohammad Farahat in support of their position that Liang fails to teach, suggest or disclose an IR light detector that detects IR *emission* as a result of IR illumination, as now claimed.

Turning to the Declaration, it is respectfully submitted that, although the visible/IR light source 20 likely produces IR light to illuminate the image, the IR light is not used to render the image *fluorescent*; rather the IR light causes light to be *reflected back* from the image. As noted in the Declaration, as is known in the art, *fluorescence* is a phenomenon in which a substance *emits* light in response to absorption of light from some other source. On the other hand, *reflectance* is a phenomenon in which a fraction of the total light incident on a surface is *returned back.*

Thus, it is respectfully submitted that Liang also teaches:

B1) illumination with an IR light source producing IR light, and

B2) detection of IR reflectance,

but again fails to teach, suggest or disclose an IR light source that illuminates the mark and an IR light detector that detects IR *emission* as a result of the IR illumination, as now claimed.

The Examiner notes that it is known from Liang to use substances which fluoresce in the infrared portion of the electromagnetic spectrum and cites col. 2, lines 46-48 (see Office Action, Page 7). In that section of Liang, Liang is actually referring to a prior art methodology and continues at line 48 to note that such fluorescence is a result of illumination with visible light, ("Yet another class of authentication methods uses substances which fluoresce in the infrared portion of the electromagnetic spectrum *when illuminated by light in the visible portion of the spectrum,*" emphasis added.)

It is respectfully submitted that Liang (nor the art referred to in Liang and highlighted by the Examiner) simply does not teach or suggest an IR light source that illuminates the mark and an IR light detector that detects IR emission as a result of the IR illumination, as now claimed. Rather, Liang teaches A) illumination with a UV light

source producing UV light and subsequent detection of fluorescence as a result of the UV illumination, and B) illumination with an IR light source producing IR light and subsequent detection of IR reflectance.

Shaw

Shaw teaches an optical reader for luminescent codes. The Shaw device includes a light source which strikes a marking area to cause it to luminesce.

On Page 7 of the Office Action, the Examiner notes that Shaw (at col. 2, line 67) teaches that infrared emission is possible. However, Shaw explicitly states that such emission is a result of excitation using a UV light source.

> "A symbol marking area is shown at 1 in the form of a circle, enormously exaggerated in size for clarity. Excitation is from a standard UV lamp, which is shown purely diagrammatically as rectangle 2. The ultraviolet beam strikes only a single marking area at a time. The symbol marking area on illumination with ultraviolet photoluminesces in all of the wavelength bands of the particular components present in the marking area and which define the symbol. It should be noted that some symbols require the presence of only one component, and it should, therefore, not be considered that the present case requires the presence of more than one photoluminscent component. The photoluminscent radiation, which is usually in the visible, although with some components may be in the very near infrared, is now projected through a dispersing element 3." (Col. 2, lines 53-67.)

Thus, it is clear from the foregoing that Shaw teaches detection of visible and very near IR light as a result of excitation using UV light and not as a result of excitation using IR light, as now claimed. Nowhere in Shaw is taught a device that has an IR light source to illuminate the mark and an IR light detector to detect IR emission as a result of the IR illumination.

Stenzel

Stenzel teaches a device for detecting emission spectra from a paper document and includes a light source for exciting fluorescent substances, the emission of which is detectable with photocells (see Abstract). As noted by the Examiner, Stenzel teaches that the paper can carry a material which in the excited condition, fluoresces in the infrared range. However, nowhere in Stenzel is taught a device that has an IR light source to illuminate the mark and an IR light detector to detect IR emission as a result of the IR illumination. Instead, at col. 7, lines 26-32, Stenzel states,

> "The paper 1 is illuminated by a light source 2. Depending on the wavelength required to excite the fluorescent substances, the light source is a high-or low-pressure gas discharge lamp, a photo-flash lamp or an incandescent lamp. However, the fluorescence may also be excited with an X-ray tube, an electron ray tube, or a radioactive substance."

Stenzel simply fails to teach, suggest or disclose an IR light source that illuminates the mark and an IR light detector that detects IR emission as a result of the IR illumination, as now claimed.

Falls

Falls teaches an authentication device including the use of two UV excitable lumiphores, with one emitting in the visible spectrum and the other emitting in the IR spectrum (see Abstract). Further, the device itself includes an excitation source 16 having a suitable lamp 64 that generates the UV radiation (see col. 4, lines 29-46) necessary to excite the two UV excitable lumiphores.

Falls also teaches materials that fluoresce in the IR range and the Examiner recognizes this and cites col. 3, lines 49-51.

Continuing at line 54, however, Falls states,

> "The working principle of the invention is best described with reference to FIG. 1. Ultra-violet radiation 32 emanating from the excitation source 16 strikes the treated target area 14 of the sample 12 and excites the two lumiphores with which the target area 14 previously had been treated. As a result of this ultra-violet excitation, the two lumiphores begin to emit from the target area 14 radiation 34 that contains the characteristic emitted radiations of both lumiphores, that is radiation both in the visible range,

> preferably at 625 nanometers, and in the infrared range, preferably at 875 nanometers."

Thus, it is clear from the foregoing that Falls teaches detection of UV or IR light from the lumiphores, but in both cases as a result of excitation using UV light and not as a result of excitation using IR light, as now claimed. Nowhere in Falls is taught a device that has an IR light source to illuminate the mark and an IR light detector to detect IR emission as a result of the IR illumination, as now claimed.

B. Rejection

Thus, even assuming for the sake of argument that one of ordinary skill in the art would have been motivated to combine the references, it is respectfully submitted that the resulting combination would not result in a device that includes "an IR light source... producing IR light having a wavelength in the IR range and irradiating the light-sensitive compound in the authentication mark with the IR light; and a snapshot mode detector comprising an IR light detector adapted to detect IR light emission having the first wavelength in the IR range from the light-sensitive compound in the mark after the mark has been irradiated with IR light from the IR light source", as now claimed. Accordingly, it is respectfully submitted that the rejection of the claims under 35 U.S.C. §103(a) as being unpatentable over Liang in view of Shaw, Falls and Stenzel et al. be withdrawn.

CONCLUSION

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicants' attorney at the telephone number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicants hereby request any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 23/2825.

Respectfully submitted,

McInerney et al., Applicants

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Henry F. McInerney, et al.
Serial No:	09/556,280
Conf. No.	7997
Filed:	April 24, 2000
For:	PORTABLE AUTHENTICATION DEVICE AND METHOD OF AUTHENTICATING PRODUCTS OR PRODUCT PACKAGING
Examiner:	Rosenberger, Richard A
Art Unit:	2877

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF MOHAMMAD FARAHAT UNDER 37 C.F.R. §1.132

Sir:

I, Mohammad Farahat, declare that:

1. I received a Bachelor of Science degree in Chemical Engineering from Rensselaer Polytechnic Institute, a Master of Science degree in Chemistry from Worcester Polytechnic Institute and a Doctor of Philosophy degree in Chemistry from Boston University and have been working in the field of fluorescence detection, spectroscopic analysis and product security since 1993.

2. I have been employed with Sun Chemical Security, Inc., which is the Assignee of the present application, for approximately one year and am presently the Director of Research & Development. My duties include the investigation, conceptualization, design, prototyping, development and testing of specialized materials and authentication devices for use in brand protection and product security. My duties also include the supervision of a team of scientists and engineers also responsible for the duties described above. I keep current with activities in the security/authentication arena and regularly read competitive materials and literature concerning the latest technical advances in the field.

3. Prior to joining Sun Chemical Security, Inc., I was employed with PhotoSecure, Inc. of Boston, MA where I was the Chief Technical Officer from 2002-2003 and a Scientific Consultant from 2000-2002. My duties at PhotoSecure included the management of all technical aspects (including research, development, production and quality control) of specialized security materials and devices for security marking and supply chain monitoring and the development of stationary and hand-held authentication devices for printed invisible markings.

4. Prior to joining PhotoSecure, I was employed with various companies responsible for the design and development of various spectroscopic analytical instruments and devices. My Postdoctoral Fellowship was conducted at the NSF Center for Photoinduced Charge Transfer at the University of Rochester, Rochester, NY. My research dealt with transient spectroscopy of dyes and aggregates in organized media.

5. My relevant technical experience also includes: electro-optic instrument design and development; electronic imaging; multivariable statistical analysis of spectroscopic data; chemometric methods development; steady state spectroscopy including UV, VIS, NIR, MIR, luminescence and Raman techniques; time-resolved laser-based absorption and emission spectroscopy; Langmuir-Blodgett film fabrication and analysis; multi-step organic synthesis; scanning tunneling microscopy; computational chemistry; FT-NMR; spectral oil analysis; and related electronics circuit design, software design and programming, and computer interfacing.

6. I have studied the above-referenced patent application (US Serial No. 09/556,280) and the prior art references applied in the current Office Action (dated February 9, 2005) and in particular US Patent 5,719,948 to Liang.

7. Liang is directed to an apparatus for fluorescent imaging and optical character recognition that employs an authentication device having an ultraviolet light source and a device for capturing and recognizing graphic images made with fluorescent substances that fluoresce after excitation with the UV light. Liang also discloses that the authentication device can have an optional visible/IR light source 20. This light source can produce IR light

because, at column 2, lines 7-10, Liang states that "visible/IR" means "light either entirely in the visible portion or *entirely in the infrared portion*, or partly in both visible and infrared portions of the spectrum" (emphasis added). Given that Liang states "visible/IR" means either visible light, infrared light, or both, in my view, the "visible/IR light source 20" can therefore produce IR light.

8. I also read Liang as disclosing that the optional visible/IR light source 20 is used to illuminate an image, where light is thereafter *reflected back* to the reader. I do not read Liang to disclose that the visible/IR light source 20 is used to render the image *fluorescent*. To support my conclusion, I refer to several sections of Liang beginning with column 5, lines 10-14, which states, "The authentication system of the present invention as considered from one point of view combines as major elements a UV light source 10 for illuminating articles to be authenticated and for excitation of fluorescent radiation". I found no other alternative methodology (i.e., the use of IR light) in Liang for exciting the fluorescent substance to cause the substance to fluoresce. At column 4, lines 24-29, Liang recites, "The detector may be capable of detecting both fluorescent images and normal visible images, and the authentication system may incorporate switching mechanisms to allow multiplexed acquisition of fluorescent and normally visible images produced by visible/IR or visible/UV illumination." I read this statement as reciting that the visible images become visible after they have been illuminated with visible/IR light or visible/UV light and, consistent with the statement at column 5, lines 10-14 reproduced above, the fluorescent image fluoresces after excitation with UV light. Continuing at line 40, Liang states, "The recognition logic of the authentication system can include comparison of these two (fluorescent and visible/IR, fluorescent and visible/UV, or two different fluorescent) images with each other." This concept is reiterated in Liang at column 7, lines 50-53, which state, in summary, that two multiplexed images, "such as a fluorescent image and a visible/IR image" may be compared. Liang continues at lines 59-64 by stating "The two images may be a conventional image detectable with visible-light illumination and a fluorescent image detectable under UV illumination, or two distinct fluorescent images having different fluorescent wavelengths, both made detectable by UV illumination." Because Liang distinguishes between fluorescent images and other images that

are visible/IR, in my view, the image that includes the visible/IR light then is not a fluorescent image, or else Liang would have referred to such an image as a *fluorescent* image. Rather, in my view, the image that includes the visible/IR light is a result of *reflectance*. So, to the extent the image contains IR light, it is the *reflected* IR light (and not *fluorescent* IR light) that forms the image. As is known in the art, reflectance is a phenomenon in which a fraction of the total light incident on a surface is returned back whereas fluorescence is a phenomenon in which a substance emits light in response to absorbption of light from some other source. In sum, in my view, Liang discloses images that result from IR refectance in response to illumination from the visible/IR light source 20, as opposed to images that result from IR fluorescence in response to illumination from the visible/IR light source 20.

9. All statements made of my own knowledge are true, and all statements made on information and belief are believed to be true. I am aware that willful false statements and the like are punishable by fine or imprisonment or both (18 U.S.C. 1001), and may jeopardize the validity of the above-referenced application or any patent issuing thereon.

Mohammad Farahat

May 6, 2005
Date